WHAT IS ALCOHOL?

1. Alcohol is not found in nature. All those things designed for the nourishment of man are the product of life and growth; alcohol is the result of death and decay. The chemist Faraday calls it "the rubbish of life."

2. When organized matter decays it is separated into its original elements. During this process, when the particles are free to move around among themselves, as in a liquid, chemical affinity may unite them at any stage into

new substances. This is precisely what is done in the formation of alcohol. When sugary matters, in a liquid form, are left to decay in a temperature between sixty and eighty degrees Fahrenheit, other conditions being favorable some of the first changes produce carbonic acid and alcohol. Ethyl alcohol, the characteristic intoxicant of our drinks, is practically always produced in this way by the decay or fermentation of sweet liquids.

3. If continued in the same temperature, with exposure to the air, the process of decay continues through various changes until the entire vegetable organism has returned to its original elements, and nothing remains in the vessel but water and an earthy sediment. To prevent this loss of alcohol the fermentation is "controlled" by various devices. All fermented liquors, including domestic wines, contain alcohol, its per centage being frequently

increased by previous additions of sugar. In their best state they are *rotten drinks*, being simply fruit-juice rotted.

4. In the manufacture of malt liquors some of the starch of the grain is changed into sugar by the process of sprouting. Then the germ is killed, the grain mashed, the sugary matters are washed out and set to decay in what is called the "wort," yeast being added to promote the fermentation. Thus alcohol is formed by the same process of decay, as in the case of the fermentation of fruit-juices. The ales, beers, and porters are all rotten drinks. Lager beer gets its name from the German verb "*lagen*," (to lie,) because it lies and rots longer than other beers.

5. It must be noted, however, that one of the peculiarities of chemical action is that it changes the nature of things. It cannot, therefore, be inferred that these brewed and

fermented liquors have any of the characteristics of the substances of which they are made. Wine is not the "essence of the grape," nor is whisky the substance of the grain.

6. The proportion of alcohol in all these brewed and fermented liquors depends mainly on the amount of sugar decayed, not exceeding enough to produce fifteen per cent. of alcohol, unless added subsequently. Sugar enough to produce a large per centage of alcohol prevents the decay of the liquid, as does also the presence of a large proportion of alcohol. The remaining part of the liquid is mostly water. If the alcohol is wanted stronger, heat is applied to these decayed liquors, and as the alcohol is more volatile than the water, it passes off first, and is collected and condensed. This is distillation. It does not in any case produce alcohol; it only separates

it partially from the water. This process produces ardent spirits of various sorts, whiskies and high wines, which are about half alcohol, and are known as "distilled liquors." In this way we get gin from beer, rum from fermented molasses, and brandy from wines and other fermented fruit-juices.

7. The alcohol in all these is the same precisely that it was in the fermented and brewed liquors before the distillation. Indeed, alcohol is a chemical substance, having exactly "two parts oxygen, four carbon, and six hydrogen," and any change in its component parts would make it something else. It has its origin in fermentation, and it does not exist in any of the grains or fruits of which it is made. It avails nothing to say that its elements exist in them, for these elements form a large share of many articles of food. They are precisely the same that we find in starch and in sugar, but in dif-

ferent proportions. This particular combination has its part to play in the decay of liquids, for it is very volatile, and by its evaporation it helps to get the decaying matter more speedily out of the way. This seems to be its natural use, to help liquids back again to their original elements; though it is rarely or never needed, nor found, excepting where liquids are held in considerable quantities, and therefore almost necessarily in artificial reservoirs; consequently it is almost, if not quite, invariably the result of the intervention of human agency.

8. The difference in the effects produced by different alcoholic drinks is due to the variation in the proportions of alcohol which they contain, and also to the presence of other substances in small proportions, some of these, like fusil oil, being very poisonous.

9. In so-called "natural" liquors these are all the results of decay, but there are added

to many liquors, in the ordinary process of preparation, substances besides alcohol which are really injurious, like the hops in beer.

10. Besides these, it is well known that manufacturers and dealers covertly use large quantities of virulent poisons in their liquors, such as strychnine, sugar of lead, cocculus indicus, opium, stramonium, etc. The exposure of these adulterations has frequently injured their business temporarily, but they soon succeed in persuading each his own customers that *he* keeps the pure article, which he avers is safe and wholesome, while the usual bad effects of drinking, which he cannot deny, come only from the adulterating poisons which *other* men use. So the argument from the common use of adulterations has practically very little weight in favor of temperance. It really deters very few men from drinking.

11. The truth is, that whatever else is put

in or left out of the drink, the alcohol is what people wish and expect, and without which they would not drink it; and, though the more poisons of any kind are put in the worse the liquor is, the alcohol is the worst poison of them all. Dr. Lees, in speaking of absinthe, asserts that it owes its worst effects to the strength of its alcohol, and adds that "no possible drugs or adulterations can be so bad as this essential and characteristic element."—*Text-Book*, p. 91.

Certain it is that no other drug has exercised so deleterious an influence on the human race, combining fascinations so powerful with effects so wide-spread and so destructive.

HUNT & EATON,
150 Fifth Avenue, New York.

CRANSTON & STOWE,
190 W. Fourth St., Cincinnati, O.